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A Critical Summary of Some Research Studies
Conducted in the Field of Audio-Visual Materials
as Applied to the Elementary School

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A CRITICAL SUMMARY OF SOME RESEARCH STUDIES CONDUCTED IN THE FIELD OF AUDIO-VISUAL MATERIALS AS APPLIED TO THE ELEMENTARY SCHOOL.

Submitted by

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(B. S. in Ed., State Teachers College

at Bridgewater, 1937)

In partial fulfillment of requirements for

the degree of Master of Education

1947

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CHAPTER ONE

THE PROBLEM

The problem upon which this study is based is a critical summary of some research studies conducted in the field of audio-visual materials as applied to the elementary school.

More research studies have been conducted in the field of visual materials than have been in the field of audio-materials. Studies concerning motion pictures are predominant in the visual field, while only meager research has been reported on the use of graphic materials and school journeys. Research in the audio-materials is centered in mobilizing the interest of teachers and administrators on the varied potentialities of the school broadcast as an instructional device. Much research on audio-visual materials has been done in the secondary school level, but the author has limited himself to experimental research that relates to the elementary school.

An abstract was made of each study listing the method of experimentation, the procedure used, and conclusions reached. A critical analysis of each study was constructed which considered the importance of the problem, the selection of the best type of set-up, adequate control of all operating variables other than the experimental factor, the administration of an adequate measurement program, the adequate reporting of the experiment, and provision for the possibility of repetition of the study in further research in the same field.

Two general summaries consisting of conclusions resulting from these experiments were made. The first summary concerned itself with the results of studies conducted with visual materials in the fields of motion pictures, graphic materials, and school journeys. The second summary listing conclusions resulting from studies conducted with audio-materials that placed emphasis on the field of school broadcasts.

In listing the summaries an attempt was made to arrange the conclusions so that continuity was present.

CHAPTER TWO

GENERAL SUMMARY

There have been no experiments conducted that have come to the writer's attention which have shown a loss in the amount of learning when pupils were taught through the use of films, slides, graphs, charts, and school journeys, as compared with pupils who were not taught through the use of visual materials. Many definitely showed that visual materials are a distinct asset to effective teaching.

Hansen (11) in his study found motion pictures an aid to learning especially in the acquisition of information. To determine the most effective method of teaching current history in the elementary schools, Eichel (8) in his study found that the film is a more effective teaching medium than a current news periodical, even though that periodical is especially prepared for the study, and the film is not. McCowen (23) agrees with Hansen and Eichel, but added that when films are deliberately planned and consciously used they should make the student better acquainted with the world in which he lives, and stimulate him to better thinking.

Meader (25) found pictures an effective aid in the teaching of geography. A noticeable improvement in interest, attendance, and ability in self-expression in social studies, due to the use of sound films in teaching retarded children, was stated by Mahoney and Harshman (21).

Numerous studies dealing with relative values of

sound and silent films have appeared. Goodman (10) claims sound films have had an undue amount of emphasis placed upon them, and their value in the classroom has been too readily assumed. Clark (3) agrees with Goodman, stating that sound films are less effective than silent films with printed captions, in conveying specific information, but asserted that sound films are more effective than silent films in stimulating a present interest. In his study, Hansen (12) claims that the verbal explanation accompanying a film of the sound type can be presented as effectively by the classroom teacher, as by the medium of the recorded voice and the sound motion picture projector.

To determine if films, unless integrated with the regular classwork, are of questionable teaching value, Jayne (16) found that with the procedures used, the gain in information produced by the integrated method is significantly greater than that produced by the non-integrated method. In a study to show correlation between conduct and films, Freeman and Hoefer (9) concluded that instruction, of which motion pictures are a part, tend to influence conduct. Day (7) states that a visual materials program should be an essential part of the regular school program, and that education in visual instruction should be required of all teachers.

Maneval (22) showed that pupils of higher mental ability tend to be taught more effectively by the study sheet method, average ability group taught equally well by either

method, and pupils of lower mental ability tend to be taught more effectively by the sound film method. Wittich and Fowlkes (33) disagree with Maneval claiming children of low and high intelligence quotients learn equally well from films, although previous beliefs held that superior results are obtained with low intelligence quotients.

Although the motion picture is the predominant aid in the visual field, each of the other aids has a specific part to play. Each aid has more or less a specific function.

Only meager research has been reported on the use of graphic materials and the abilities required to read them. Thomas (29) made a study of the abilities of fourth, fifth, sixth, and seventh grade pupils in the reading of circle, two-dimension, diagram, horizontal, bar, multiple pictures, and line graphs. She concluded that slow fourth grade children derive little meaning from graphs, butsuperior fourth graders understand the meaning and can read simple facts from them. Thomas also concluded that the bar-graphs are the form most favorable to tb recall of relative amounts when the comparison called for involves a fair degree of difficulty. Washburne (30) in a study of methods of presentating quantitative material stated: a) for complex or slightly complex comparisons use a bar-graph, b) for simple comparisons use a pictograph, c) for dynamic comparisons use a linegraph, d) for specific amounts use a statistical table.

Cobb (4) showed how maps should be used, and stated

no charts, except those of a purely pictorial nature, should be introduced before grade five. Williams (32) in a study on school journeys, brought nine hundred and thirty-nine children from grades five through eight to an Art Gallery. From her study, she concluded that a study of the techniques and composition, or facts about the artist apparently contributes very little to the enjoyment of the picture. On museum visits, Ramsey (28) stated that fifth grade children learned more when the museum instructor lectured to them in the museum halls, than they did with any other method. Ramsey also stated that discussion methods were superior to lecture methods for pupils of grades seven and eight.

CLARK, CLARENCE C., "SOUND MOTION PICTURES AS AN AID IN CLASSROOM TEACHING," THE SCHOOL REVIEW, (NOVEMBER, 1932), 669-81.

Problem:

To establish as exactly as possible the values of educational sound motion pictures as compared with silent motion pictures and lecture demonstrations.

Method:

Experimental

Procedure:

The problem was concerned with the subject of science. Two phases of the problem of evaluating the use of sound motion pictures as a teaching aid were studied: the relative values of such pictures as a means (a) for the conveying of concrete knowledge or information, and (b) for stimulating and maintaining interest.

Pupils were divided into two groups of approximately three hundred each. Groups were equated as nearly as possible in mental capacity and educational achievement. During the last part of the experiment the students were rotated, thus becoming members of both the experimental and control groups at different times.

Complete equipment for the projection of sound and silent motion pictures was permanently installed in the classroom. It was so installed as to prevent any distraction of the students by noise or sight of the machine. An operator

was provided in order that a sound or silent film might be shown at any time during a class. The equipment consisted of a standard 35mm. projector, and the best type of sound-reproducing apparatus.

The regular teaching staff conducted the classes throughout the experiment. Each teacher was familiar with the details of the study and taught both experimental and control groups.

Three types of comparisons of the educational merits of sound films with the merits of the other two kinds of teaching aids used were made. One consisted in using sound films with the experimental group and identical silent films with the control group. A second consisted in using sound films with all the students to illustrate divisions of the subject matter, and slightly different silent films with all the students to illustrate closely related divisions of the subject matter. The third comparison was made by using sound motion pictures with the experimental group and identical lecture demonstrations with the control group. Demonstrations shown in the control group in place of films were in all cases identical with facts shown in the films.

A battery of tests constructed for the purpose and related to the activities included in the films, and a photographic record of the students used in the experiment was made when these students were subjected to certain pre-determined influences.

Conclusions:

When sound films of the lecture type are compared with identical silent films in which all explanations are given by printed caption, the sound films are less effective than silent films in conveying specific information.

In stimulating new interests the sound films, silent films, and lecture demonstrations are about equally effective--a small advantage in favor of tฮ sound films being indicated.

In stimulating a present interest as measured by the extent of sustained attention on tฮ part of the pupils, sound films are more effective than are the silent films or the demonstrations used.

CRITICAL ANALYSIS

This problem is important, because of the divided opinion concerning the relative values of sound and silent films. The experimental factor was accurately defined. In the process of being solved, the problem was separated from other factors.

The subjects were divided into two groups of approximately three hundred each, and were equated as nearly as possible in mental capacity and educational achievement. The author failed to mention how the above facts were obtained. The rotation-group method used was desirable because whatever differences there might have been in general ability would be rotated out as a factor influencing the results of the study

as each procedure would be affected in like degree.

The control of factors other than the control factors was good because the control factor contained the same facts as was seen in the sound film. The regular teaching staff conducted the classes during the experiment. Each teacher was familiar with the details of the study and taught both experimental and control groups. This eliminated the possibility of variance of teaching procedure. The elimination of any distraction of the subjects by noise or sight of the projector was good. The large number of subjects involved in the study makes the conclusions more reliable.

The author validated his testing program by constructing a battery of tests for the purpose and related to the activities included in the films.

The conclusions resulting from this experiment were reported under three generalizations, namely: in conveying specific instruction, in stimulating new interests, and in stimulating a present interest. This is a satisfactory report of the problem.

There is need for further research in this problem, in that a study should be made in regard to the achievement of bright and dull children, and type of teacher using each method. Results in other areas of the curriculum should also be studied.

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COBB, MYRTLE S., "WHEN AND HOW TO USE MAPS," THE NATION'S SCHOOL, (JUNE, 1939), PP. 36-7.

The author believes that educators have recognized the necessity of maps, globes, and charts as part of elementary classroom equipment and in the teaching of social sciences, but few have recognized their place in the teaching of other elementary subjects. Each time a map symbol is introduced, the teacher should make certain that a picture behind the idea for that symbol is clearly visualized. A child should see pictures of a river taken in the air at various elevations above the river to grasp the idea that the higher one is above the river, the narrower and longer it becomes. He will then accept the theory that if one could be high enough above the river, he would eventually see its banks converge into a wavy line. Then, a black wavy line on the map takes on new meaning to him.

Maps, globes, and charts can be made a vital part of the unit for purposes of motivation, assimilation, application, and testing. For motivation, these tools will often lead the pupils to raise worthwhile problems.

For assimilation, boys and girls will learn to turn automatically to maps and charts for firsthand information when they are assimilating data for the solution of a problem. It is worthwhile to prepare guide charts that will enable them to undertake an independent study of these tools in a systematic manner.

For application, blank outline maps and charts provide an excellent opportunity for the pupil to create meaningfull pictures with the data that has been assimilated.

For testing, maps and charts are gaining recognition, although there is room for considerable improvement. The only way a teacher can measure a pupil's ability to read, interpret, and use them is to formulate tests that actually employ their use.

Conclusions:

No charts, except those of a purely pictorial nature, should be introduced before grade five. The first chart to be used at this level should be of a semi-pictorial nature. This means that the symbols used to represent comparative statistics should recall the item symbolized.

When bar and line graphs are presented, they should be a gradual outgrowth of the more easily understood semi-pictorial charts. Pie-graphs require a knowledge of percentage for complete comprehension. Therefore, they should be reserved for use with children in the upper elementary grades.

DAY, W. J., " A GEOGRAPHY VOCABULARY EXPERIMENT WITH-AND-WITHOUT THE USE OF VISUAL AIDS," EDUCATIONAL SCREEN, PP. 378-79, (DECEMBER, 1939).

Problem:

To determine how much more effective vocabulary teaching which employs various visual aids is over instruction

which makes use of few or no visual aids.

Method:

Experimental

Procedure:

A test was first devised which covered thirty-nine words needed in the vocabulary of each child to enable the child to adequately interpret the geography reading material of the grade. Test given as a diagnostic step before any lessons covering the course were taught. Teacher retained papers for reference and guidance of teaching.

Each child's I. Q. was obtained. Class divided into two groups, each containing an equal number of subjects with high, average, and low intelligence. Each group had a combined total of ninety-three points score on the pre-study test.

Both groups used the same text and supplementary books, both covered the same units of study, and both received the same time and attention from the teacher. The only difference lay in the fact that the Non-Visual Aids Group were given very few visual aids, other than those accompanying the books used.

The Visual Aids Group were given much visual material. The following types of visual aids were used to teach the thirty-nine words: the number of words with which each was employed being indicated by the figure in parenthesis. Textbook pictures (37), other pictures (38), slides (31), motion pictures (37), dioramas (8), models (29), experiments (7),

school journeys (14), original drawings and slides (33), dramatics (23), maps (14).

The same test which had been given in September was repeated in December. The Visual Aids Group scored a total net gain of 130 points more than the net gain scored by the Non-Visual Aids Group, or an average of 9 plus higher per subject.

Conclusions:

A 22.2% gain in knowledge learned justifies the recognition of a visual aids program as an essential part of the regular school program.

Education in visual instruction should be required of all beginning teachers and urged upon all who are not beginners.

CRITICAL ANALYSIS

The problem is important, as it makes a great difference in teaching procedure whether or not various visual materials play an important role. The problem was successfully separated from other factors in the process of being solved. The experimental factors were adequately defined.

The equivalent-groups method of experimentation used was good and means of obtaining personnel for the experimental and control groups was valid. In addition to I. Q.'s, each group contained an equal number of subjects with high, average, and low intelligence, and having a combined total of ninety-

three points score on a pre-study diagnostic test. The problem was well controlled because both groups used the same reading matter, covered the same units of study, and both received the same time and attention from the teacher.

The author did not determine the degree of validity of his tests, but each word was carefully selected to enable the child to adequately interpret the geography reading material of the grade. The same pre-test was later used as a post-test.

Conclusions resulting from this experiment were reported under three generalizations, namely: an increase in efficiency; time element; and value of giving visual instruction to teachers. This is a good report of the problem.

More experimentation is needed, however, before any large generalization can be made. A study should be made using this procedure in other areas of the curriculum.

EICHEL, CHARLES G., "THE MOST EFFECTIVE METHOD OF TEACHING CURRENT HISTORY," JOURNAL OF EXPERIMENTAL RESEARCH, (SEPTEMBER, 1940), PP. 20-27.

Problem:

To determine the most effective method of teaching current history in the elementary schools.

Method:

Experimental

Procedure:

Six schools chosen because all had similiar back-

grounds from a socio-economic viewpoint. All pupils, who were from the sixth grade, given National Intelligence Test-Form B. Socio-economic questionnaire filled out by each pupil in experiment. Classes heterogeneously organized on basis of I. Q.'s, and similarity of background. In addition to experimental and control classes, a zero-point class, receiving no instruction, was part of the set-up.

Experimental class used 16 mm. film; control class a special news leaflet, especially written for this experiment, containing same facts as was seen in the film. Zero-point class was exposed to newspapers, photo reporters, and magazines, but received no instruction. Teachers chosen because of their interest in current history and visual education background. Principals selected teachers interested in current history, visual education, and general research. Same teacher taught both Experimental Class, using March of Time film, and Control Class, using Special Photo Reporter as its news medium. Same teacher also supervised zero-point class, to make sure it received no definite instruction on film topics. Each lesson series consisted of two lessons: one assigned to presentation of new topic, the other for review. Films then showed twice; and Photo Reporter read and reread. Definite lesson plans prepared by author for each teacher, and a preview of each film given them a week before the film was used.

Objective type tests used. Questions selected by

teachers as most suitable and worthwhile, and because answers could be found in both film and Photo Recorder. Tests were checked for reliability by the application of the Spearman Formula.

Pre-test given before each new lesson. Ten days later a retention test given to each of three classes to determine amount of information retained. Each test composed of same fifty questions. Follow-up test was the pretest with questions rearranged so that pupils would not have a chance to memorize material. Ten day retention test was the same as the pretest. Ten weeks later, a test of one hundred questions, composed of ten questions from each test of the ten units, was given in order to discover which group retained the most after an interval of ten weeks. A year later, one hundred forty-four pupils of the original three groups, experimental, control, and zero-point, were given the same final test. This retest was the last of the testing program. All tests marked and checked by a corps of workers trained by the author. Definite answer keys were given, so that this element was also controlled.

Findings:

A. In immediate instructional superiority
   a. Control group superior to both experimental and zero-point groups in both the individual and combined units of the experiment.
   b. Experimental group greatly superior to zero-point

groups in both individual and combined units of the experiment.

B. In retention of learnings within 10 days from the experiment

   a. Control and Experimental groups evenly matched as to number of units in which each was superior.

   b. Control and Experimental groups superior to Zero-point group in each of the units of the experiment.

C. In retention of learnings over varying intervals of time

   a. Experimental group superior to Control group ten days after lesson, at time of final test, and one year after end of experiment.

   b. of the per-cent of retention of knowledge, gained through instruction, at the time of the final re-test, the Experimental group showed a superiority of 17.6%.

Conclusion:

This experiment showed that the film is a more effective teaching medium than a current news periodical, even though that periodical is especially prepared for the experiment and the film is not.

CRITICAL ANALYSIS

The problem is important because the sound film procedure, as described in this study, was more effective than the traditional textbook-study method, since more of the information gained through the film was retained by the group so instructed. In the process of being solved, the problem was

separated from other factors. The experimental factor, the 16 mm. film, was well defined.

Equating of groups was determined by similiarity of socio-economic backgrounds and on intelligence quotients. The insertion of the zero-point group, which received no instruction, was an important phase of the study.

The control of factors, other than the experimental factor, was satisfactory because the control factor contained the same facts as was seen in the film. The same teacher taught the three groups, which eliminated the possibility of variance of teaching procedures. However, the teachers were chosen by their principals because of their general interest in visual education, current history, and general research. It is possible that the selection of the principals could have been based on opinion, and not objective facts. The author validates the teaching procedure by preparing definite lesson plans for each teacher.

The author validated his testing program by allowing the teachers to select the questions on the basis of suitability and worthwhileness. Assuming that the principals selected teachers objectively, this would tend to validate the test. The tests were checked for reliability by the application of the Spearman formula. The testing procedure was good because provision was made for a pre-test and three retention tests, using the same questions but in different sequence. These retests allowed the author to obtain a definite answer to his

problem.

The conclusions resulting from this experiment were a good report of the problem. They were reported under three conclusions, namely: in immediate instructional superiority, in retention of learnings within ten days from the experiment, and in retention of learnings over varying intervals of time.

There is need for further study in this field. A study should be made in other areas to determine the retention of knowledge gained through means of the 16 mm. film, before any generalizations can be made.

FREEMAN, FRANK N. AND HOEFER, CAROLYN, "AN EXPERIMENTAL STUDY OF THE INFLUENCE OF MOTION PICTURE FILMS ON BEHAVIOR," JOURNAL OF EDUCATIONAL PSYCHOLOGY, (SEPTEMBER, 1931), PP. 411-25.

Problem:

To determine whether motion picture films add to the effectiveness of instruction which is designed to incite children to perform specific acts.

Method:

Experimental

Procedure:

The experiment was carried on in two fifth and two sixth grades of two public schools of Chicago. Group 1 which saw the films was in one school, and Group 2, which did not see the films, was in the second school. The number of children in Group 1 was 208, and in Group 2 was 182.

Groups were equated on the basis of intelligence test scores. Since age is a factor in the development and decay of teeth, the groups were also equalized by chronological age.

The study consisted in giving the same instruction for thirteen school days to the parallel groups. Teaching was done by a trained assistant. The subject matter included instruction on the structure and development of the teeth, on diet, and the care of the teeth. The same detailed outline was followed with both groups. With Group 1 oral instruction was supplemented by pictures, diagrams, models, and two motion picture films entitled, "Tommy Tucker's Tooth" and "Clara Cleans Her Teeth". With Group 2 the motion picture films were not used.

The results of instruction were measured by: a) an information test, b) a questionnaire in which children reported, on care of their teeth at home and the food which they ate, c) material brought in by the children, and d) condition of teeth as determined by dental examination.

Findings:

Group 1, who saw the films, appears to have been stimulated to somewhat greater activity in bringing into class supplementary material.

Group 1 appears to have improved somewhat more in the condition of their teeth than the pupils that did not see the films.

Conclusion:

Instruction, of which motion pictures are a part, tend to influence conduct largely through giving clear-cut information and pointing out the applications of this information to conduct.

CRITICAL ANALYSIS

The problem is important, as it shows the influence of motion picture films on behavior. The problem was well separated from other factors in the process of being solved. The problem itself was accurately defined, as was the experimental factor: the motion picture film.

Groups were equated on the basis of intelligence test scores, and chronological age. I believe in a study of this type, socio-economic background should also have been a basis for equating.

The method of procedure was satisfactory, as the same detailed outline was followed with both groups. The same instruction was given by a trained assistant to both groups which validated the teaching procedure. The motion pictures which were used should have been chiefly of an informational nature to harmonize with the character of the general unit of instruction. The author claims that suitable informational films could not be obtained, and the films which were used were cast in story form.

A comprehensive testing program including an infor-

mation test, a questionnaire, supplementary material brought to class, and dental examination of teeth was used.

The conclusions resulting from this experiment were reported under two generalizations, namely: improvement in condition of teeth, and stimulation in bringing into class supplementary material. This is a satisfactory report of the problem.

There is need for further research on this problem, in that a study could be made in regard to the behavior of different intelligent levels, and behavior of groups in other areas of the curriculum. Further experimentation would be desirable with films which may be more effective than those which were used in this study.

GOODMAN, DAVID J., "THE COMPARATIVE EFFECTIVENESS OF PICTORIAL TEACHING AIDS," JOURNAL OF EXPERIMENTAL RESEARCH, (SEPTEMBER, 1943), PP. 20-27.

Method:

Experimental

Procedure:

In setting up the experiment it was necessary that the four different aids comprising each set of materials on a specific safety subject contain equivalent factual information. The aids differed only in the physical forms and characteristics inherent in each medium. Four different films were obtained, each for approximately the same age level, each available in 16 mm. and 35 mm. size, and with the 16 mm. available

in both sound and silent, so that the material might be equivalent .

In preparing film strips, the writer selected from each sequence in the 35 mm. film the specific frame, which in his judgement, most effectively illustrated the safety concept being prescribed. Approximately twenty textual frames were then selected from the film which related especially to the photographic frames previously selected. Each of the individual frames, photographic and textual, was produced into a set of lantern slides. The sound slide film was prepared by recording all the textual frames of each slide set on a special disc which was synchronized with the photographic frames of the film slide set. Thus, the two slide film aids were identical. A committee of three experts viewed the materials to determine whether the most essential safety concepts of each film had been selected. All their suggestions were incorporated in the final set of materials.

The author next prepared four separate tests, one for each of the safety subjects selected. Each test consisted of fifty multiple-choice questions, selected after an analysis of the contents of each frame used in the lantern slide. The fifty questions of each test varied in degree of difficulty. The tests were validated by administering them to classes of sixth grade pupils of New York City schools. The questions were also checked by sixth grade teachers for suitability of vocabulary and sentence structure for that grade level.

Eight sixth grade classes numbering two hundred forty pupils participated. Approximately one hundred thirty were from classes of high I. Q.'s, while the remaining pupils were from low I. Q.'s. The range and mean I. Q. scores of all classes within each I. Q. group were comparable.

Findings:

All four aids are effective for presenting safety information.

The silent picture produced the largest gains in test scores, for both immediate and delayed recall.

The silent and sound film slides followed the silent motion picture in size of gain produced, on both immediate and delayed recall.

The sound motion picture produced the least gain in test scores in both instances.

Conclusion:

The sound motion picture is the least effective aid among the silent picture, silent film slide, and sound film slide, for achieving the type of result in safety education used as a measure in this experiment. The sound film has had an undue amount of emphasis placed upon it, and its value in the classroom has been too readily assumed.

CRITICAL ANALYSIS

The problem is important as the visual aids are used widely in education and their use should be justified. There is also the problem of money being spent for expensive

equipment, and this, too, should be justified. The problem was accurately defined, as well as the experimental factors: sound and silent motion pictures, sound and silent slides; and the textual material automobile, fire, pedestrian, and bicycle safety which were the controlled factors. The problem was well separated from other factors in the process of being solved.

The procedure used was good as the author went to great pains to validate his experimental factors. The motion pictures were identical as were the slides, and the author incorporated into his experimental factors the suggestions of three authorities who viewed his materials.

The equating of the groups was determined by the I.Q.'s of the subjects. The range and mean I.Q. scores of all classes within each I.Q. group were comparable. In equating the experimental groups the author neglected to make any provision for mental age, socio-economic backgrounds, sex, health, and any previous knowledge of the subject the pupil might have acquired. Some of the above mentioned factors should have been included with the I.Q. when the groups were in the process of being equated.

The problem was well controlled in both groups and the teaching procedure was valid, as the regular classroom teacher did not enter the experiment. The author conducted the experiment and administered the tests in all classes, so that all subjects received equal treatment. The author validated his tests by administering them to eight classes of sixth

grade pupils of the New York City schools, as well as having teachers of the sixth grade check the test for suitability of vocabulary and sentence structure for that grade level, before the actual experiment was started.

The conclusions resulting from this experiment were adequate in that they reported the effectiveness of all the aids for presenting safety information, and the value of silent projection over sound projection for presenting safety information.

There is need for further research in this problem before any generalizations can be made. Studies should be made of the effectiveness of various pictorial teaching aids in other areas of the curriculum.

HANSEN, J. L., "THE EFFECT OF EDUCATIONAL MOTION PICTURES UPON THE RETENTION OF INFORMATIONAL LEARNING," JOURNAL OF EXPERIMENTAL RESEARCH, (DECEMBER, 1933), PP. 1-9.

Problem:

What are the contributions of educational motion pictures to the retention of informational learning?

Method:

Experimental

Procedure:

Subjects used consisted of approximately two hundred fifty pupils. Groups composed of eighty-two pairs equated according to mental age, intelligence quotient, and previous

knowledge of the subject as measured by initial test of information. There was no matching as to sex.

Topic studied was the making of pottery. A 16 mm. film was the experimental factor in the experimental set-up. Reading matter consisting of a two thousand word written exposition describing in detail all of the steps pictured in the film was the control factor. Every possible effort to make film and written exposition as comparable as possible was made.

The test consisted of three parts, totalling one hundred and two items. Part 1 was made up of twenty-seven statements to be completed by indicating one of five given terms. Part 2 consisted of eleven true or false questions. Part 3 was made up of twenty true or false questions. The test was given three times. First, ten days before presentation of film to discover extent, if any, of knowledge subjects might have on the topic. Second, immediately after subjects received their instructions in topic to be studied. Third, three weeks later to measure the modes of presentation upon the retention of what had been learned as shown by the second test. No attempt was made to determine the validity of the test. However, all items were carefully selected by the author to cover information given in the written exposition and the film.

Conclusion:

The educational motion picture is an aid to learning, especially in the acquisition of information as portrayed in

the film used in this study. Knowledge gained through the means of pictorial presentation is fully as permanent in its nature as that gained through reading and oral presentation.

CRITICAL ANALYSIS

The problem is important, as it makes a great difference in teaching procedure and should be justified because of its widespread use. The problem was separated from other factors in the process of being solved. The experimental factor: the 16 mm. film, was accurately defined. The equivalent groups method of experimentation used was good and means of obtaining personnel for the experimental and control groups was valid, because in addition to mental age, and intelligence quotient, T_1 served to equate the groups and to determine initial knowledge subjects might have had. Socio-economic background, sex, chronological age, and health were ignored by the author.

The problem was well controlled in both equating groups and teaching procedure because both groups were taught by the same instructor, and the tests were administered by the same individual. This procedure insured, as nearly as possible, uniform treatment for both groups. No attempt was made to determine the validity of the tests. However, all items were carefully selected to cover information given in the written exposition and the film.

The conclusions resulting from this study were adequate to this problem in that the motion picture aided in the

acquisition of learning as portrayed in the film used, and the results of the tests given showed that pictorial presentation is as permanent as is oral and reading presentation. More experimentation is needed in teacher selection to use this procedure, other areas of the curriculum, and the ideal class size before any large generalizations can be made.

HANSEN, JOHN ELMORE, "THE VERBAL ACCOMPANIMENT OF THE EDUCATIONAL FILM--THE RECORDED VOICE VS. THE VOICE OF THE CLASSROOM TEACHER," JOURNAL OF EXPERIMENTAL EDUCATION, (SEPTEMBER, 1936), PP. 1-6.

Problem:

Should a formal verbal explanation accompany the presentation of pictorial materials, or should these concrete particulars be translated into verbal forms by the pupils with the aid of the teacher?

Method:

Experimental

Procedure:

Subjects employed consisted of four hundred and fifteen pupils in grade seven of two schools. Pupils of school "A" divided into two groups of one hundred seventy matched pairs, matched according to intelligence quotient and mental age. Immediately following the pre-test for each film they were more closely matched according to intelligence quotients, mental age, and scores on the pre-test. This resulted in a considerable reduction in the numbers of pairs actually used in this study.

The same procedure was used at school "B" with thirty matched pairs. The rotated group method was used, each group having two films presented by the mechanical sound method, and two films presented by the silent-film-plus the teacher method. This further served to equalize the groups receiving instruction by the two methods. The pre-test was also the post-test.

The materials of instruction consisted of four Erpi Talking Pictures, namely: "Plant Growth", "Fungus Plants", "The Frog", and "Spiders". Two of these films are sound films. The remaining two consist of two silent films accompanied by a verbal explanation presented mechanically by an off-stage voice.

Findings:

For ordinary classroom teaching the teacher's voice is as effective as the recorded voice, while in the large auditorium the greater volume and the tone control afforded by the sound projector makes the recorded voice more effective.

Conclusion:

The results of this study seem to indicate that the verbal explanation accompanying an educational picture of the talking picture type can be presented as effectively by the classroom teacher as by the medium of the recorded voice and the sound motion picture projector.

CRITICAL ANALYSIS

The problem is important, because the majority of

educational films are of the sound type while this study advocates the effectiveness of the silent film-plus-teacher method for ordinary classroom teaching. It was well separated from other factors in the process of being solved. The experimental factor was accurately defined.

The equivalent-groups method of experimentation used was good, and means of obtaining subjects for the experimental and control groups were valid. In addition to their being matched accordingly, i. e. intelligence quotients and mental age; immediately following the pre-test for each film they were more closely matched according to intelligence quotient, mental age, and scores on the pre-test. The rotated group method was used which further tended to equate the groups.

No mention was made in this study as to experience or qualifications of teachers used. This is an important factor. The author did not attempt to validate his tests, but the same test used as a pre-test and later as a post-test together with the rotated group method would tend to make the testing program more reliable.

The conclusion from the study is adequate in that the results seem to indicate that verbal explanation accompanying an educational picture of th sound type can be presented as effectively by the classroom teacher, as by the medium of the recorded voice and the sound motion picture projector. More experimentation is needed, however, before any large generalization can be made. A greater variety of films should be used,

and they should be analyzed in some detail to determine more definitely the effect of the character of the film upon the effectiveness of each method of presentation.

JAYNE, C. D., "THE INTEGRATED VS. THE NON-INTEGRATED USE OF MOVING PICTURES IN THE CLASSROOM," JOURNAL OF EXPERIMENTAL EDUCATION, (SEPTEMBER, 1936), PP. 7-16.

Problem:

Films, unless integrated with the regular classwork, are of very questionable teaching value.

Method:

Experimental

Procedure:

Pupils participating in the study consisted of seventy sixth grade pupils, and eighty ninth grade pupils. In the sixth grade, the two classes used had been carefully equated on the basis of intelligence quotients. The ninth grade classes were not equated on the basis of intelligence quotients, but since the rotated form of experiment was used any difference in intelligence quotients was rotated out, and did not affect the validity of the study.

The units of work in the sixth grade geography classes consisted of one on Austria and one on Hungary. The sound films, "Austria" and "Hungary", were used with their respective units. The two units in the ninth grade general science classes consisted of Hot Air Heating and Simple Machines.

Two sound films, "Hot Air Heating" and "Simple Machines", were used with their respective units.

Four validated tests, one for each unit of work, were given. All were of the objective type. Each test consisted of two parts: the first covering the film material, the second covering the material not in the film. The gains from seeing the film alone were measured by the first section of the test. The total gains from the study of the unit were measured by the entire test. A unit pre-test was administered at the beginning of the unit, and the same pre-test became the post-test at the end of the study.

The rotation method of experiment was used. A definite time schedule was set up for the teachers to follow, so as to make the time element constant for each of the units of work. Detailed directions regarding the procedures for teaching the units were prepared for the use of the teachers. This standardized the general procedures used from class to class.

By one method , a film was used incidentally. Sometimes before or after the teaching of the unit to which it pertained. By the second method, a film was used at the time of the unit being taught, in such a manner that the film became an integral part of the teaching unit.

Conclusion:

With the procedures used, children learn more from a unit of work when a film is integrated with it, than in a unit when a film is used but not integrated with it.

CRITICAL ANALYSIS

The problem is important, as time and money spent on non-integrated films is largely wasted from an educational viewpoint, and is of very questionable teaching value. The problem was well separated from other factors in the process of being solved. The problem itself was accurately defined, as were the experimental factors: use of a film incidentally, and use of film at time unit of work to which it pertains is taught.

The procedure used was good. The group-rotation technique was used, with alternation taking part throughout the study. Whatever differences there may have been in general ability would be eliminated as a factor influencing the results of the experiment, as each procedure would be affected in like degree by the superiority or inferiority of a group.

No provision was made for pupils that dropped out. By the time the study was completed, it left less than fifty per-cent of those starting the experiment from which to make generalized statements. The smallness of the pupil population represented, must make all conclusions tentative.

The problem was well controlled in both groups. The teaching procedure was valid as definite time schedules were devised to make the time element constant, and detailed directions regarding teaching procedure were set-up for teachers to follow. Whatever teaching differences there may have been due to skill and personality were rotated out, since each procedure

was taught by one teacher. A validated testing program with four tests of the objective type was carried out. Whatever difficulty there may have been in test difficulty was rotated out as a factor affecting the results of the study.

Conclusions resulting from this study were reported under three generalizations, namely: learning more from a film when it is integrated with a unit of work, learning more from a unit of work when a film is integrated with it, and informational learning. This is a good report of the problem.

There is need for further research in the problem as a larger population should be sampled to verify the findings of this study. A study should be made to determine the relative values of the integrated and non-integrated methods of showing films upon other types of learning, such as changes in attitudes and understandings.

MAHONEY, AGNES AND HARSHMAN, H. L., "A SOUND FILM EXPERIMENT WITH HANDICAPPED AND RETARDED CHILDREN," EDUCATIONAL SCREEN, (SEPTEMBER, 1939), PP. 359-67.

Problem:

To measure objectively the value of the sound film in teaching a unit in social studies to those pupils who were deficient in ability to do regular work.

Method:

Experimental

Procedure:

Experiment lasted over a period of four weeks. Two

groups of boys selected. The experimental group used the classroom film, "Development of Transportation", and the control group was taught by means of classroom discussions and books, but not by the film.

In equating the groups the subjects were chosen as nearly as possible of the same mental age, chronological age, and reading ability level. Throughout the experiment, both groups were taught by the same teacher. There were nineteen subjects in each group.

Four tests were given to each group before the experiment, and the same four tests were repeated at the close of the experiment to measure progress of the groups. Because of the limited reading level of the two groups, all factual questions had to be read by the teacher and answered by the pupil either "yes" or "no".

Conclusion:

Evidence indicates the positive value of using the sound film in teaching a unit in social studies to pupils who are lacking in ability to do school work. The visual group also showed a noticeable improvement in interest, attendance, and ability in self-expression.

CRITICAL ANALYSIS

The problem is important as much emphasis is being placed on teaching retarded children, and on the various methods used. Any procedure which will benefit these pupils

is of great value. The problem was well separated from other factors in the process of being solved. The problem itself was accurately defined, as well as the experimental and the control factors.

The procedure used was good, as two balanced groups of nineteen subjects each were used in the study. The equating of the groups was determined by mental age, chronological age, and reading ability level.

The problem was well controlled in both groups and the teaching procedure was valid, as the same teacher taught both groups throughout the experiment. The testing program was valid as four tests were administered to each group before the experiment, and the same four tests were repeated at the close of the study. Because of limited reading level of the subjects, all fact questions had to be read by the teacher and answered by the pupil either "yes" or "no". Personality traits may have interfered with pupils answering test questions using this procedure. Only generalized statements could be made because of the small population in the study.

The conclusions resulting from this study were adequate. They reported the effectiveness of visual materials for presenting facts to retarded children; the value of visual materials over classroom discussions in obtaining knowledge; and the noticeable improvement in interest, attendance, and ability in self-expression.

There is provision for the possibility of repetition is [illegible] the [illegible] [illegible] solved. The problem is [illegible] adequately defined, as well as [illegible] and [illegible] factors.

The procedure [illegible], [illegible] the [illegible] of [illegible] in the study. The [illegible] of [illegible] determining of mental [illegible], [illegible], and reading ability [illegible].

The problem was well controlled in both groups since the teaching procedure was valid, as the same teacher taught both groups [illegible]. The testing [illegible] valid as [illegible] tests were administered to each group before the experiment, and the same [illegible] tests were [illegible] at the close of the study. [illegible] of the subjects [illegible] questions and [illegible] by the teacher [illegible] by the pupil [illegible] "yes" or "no". [illegible] have interfered with pupils [illegible] the [illegible]. Only [illegible] the [illegible] the study.

The conclusions [illegible]. They [illegible] material [illegible] to [illegible] the value of [illegible] [illegible] The [illegible], [illegible], and [illegible]-expression.

There is provision for the possibility of [illegible] of the study in further research in the same field, as this experiment concerned itself with only one area, a unit in social studies. A study should be made in regard to the effectiveness of visual materials in other areas of the curriculum, with handicapped and retarded children.

MANEVAL, ROY V., "THE RELATIVE VALUE OF SOUND MOTION PICTURES AND STUDY SHEETS IN SCIENCE TEACHING," JOURNAL OF EXPERIMENTAL EDUCATION, (SEPTEMBER, 1939), PP. 39-43.

Problem:

To determine the value of two methbds of direct instruction: (a) by the use of educational motion pictures, and (b) by the use of printed study sheets.

Method:

Experimental

Procedure:

Data collected during the school year of 1938-1939. Eighth grade science students were paired according to mental age, science reading ability, and sex. There were one hundred and eighty pairs remaining at the conclusion of the study.

Eight sound pictures on science subjects produced by Erpi Classroom Films, Inc. were selected. Four teaching units were made of these by combining them as follows: Ground Water and Volcanoes in Action, The Work of Rivers and The Work of the Atmosphere, Water Power and The Conservation of Natural Resources, and The House Fly and The Geological Work of Ice. The study sheets were made to resemble parts of science texts

and workbooks. The lectures, which are a part of the Erpi Films, were used as the basis of text sections. They were changed only enough to make them understandable without the motion pictures. The workbook sections consisted of uncompleted statements relative to the main ideas of each text section.

Multiple choice tests were constructed for each unit of instruction. Each test consisted of fifty-six items, twenty-eight for each of the two subjects of the unit. The reliability of each test was determined by the chance halves method.

On the first day of experimental teaching, the X-Group was taught by the use of the sound motion pictures, and the Y-Group by the study sheets. In teaching with the sound film, each film was viewed twice by the subjects. The study sheet group read both text section twice, and then filled in the blanks of the workbook. The time for instruction was the same in both groups. No comments were made by the teacher, concerning the content of the instructional matter.

The day after teaching, a test based on the unit taught was administered to all subjects. Thirty days later subjects were re-tested for delayed recall. Pupils were then re-taught by the same method, using only one-half the time used for the original teaching. The following day, all subjects were tested again. The groups were then rotated, before each of the next three units of teaching.

Conclusion:

From this study it can be seen that pupils of higher mental ability tend to be taught more effectively by the study sheet method; the average group seems to be taught equally well by either method; and pupils of lower mental ability tend to be taught more effectively by the sound film method.

CRITICAL ANALYSIS

The problem is important, as it makes a great difference in educational procedure whether sound motion pictures or the use of printed study sheets is of more value in direct instruction. The problem was accurately defined, as were the experimental factors: sound motion pictures and printed study sheets.

The procedure used was good, as the author went to great pains to validate his experimental factors. The study sheets were made to resemble science texts and workbooks. The lectures, which were a part of the Erpi Films, were used as the basis of text sections. They were changed only enough to make them understandable without the motion pictures. The workbook sections consisted of uncompleted statements relative to the main ideas of each text section.

The subjects were equated according to mental age, science reading ability, and sex. No provision was made for socio-economic background, and any previous knowledge of the material the pupil might have acquired.

The problem was well controlled in both groups. The

teaching procedure was valid, as the same teachers conducted the study. The time for instruction was the same for both groups. The author validated his testing program. After each of the four units, the groups were rotated. The reliability of each test was determined by the chance halves method. There were one hundred and eighty pairs remaining at the conclusion of the study, a large enough number from which to make general statements.

The conclusions resulting from the study were adequately reported under three generalizations, namely: pupils of higher mentality tend to be taught more effectively by the study sheet method; the average group seems to be taught equally well by either method; and pupils of lower mental ability tend to be taught more effectively by the sound film method. This is an excellent report of the problem.

There is provision for the possibility of repetition of the study, and further research in the field. A study should be made to determine whether the above conclusions are true in other areas of the curriculum, with different age groups, and to determine the ideal class size.

McCOWEN, MAX C., "A CONTROLLED EXPERIMENT IN VISUAL EDUCATION IN GENERAL SCIENCE," EDUCATIONAL SCREEN, (APRIL, 1940), PP. 143-172.

Problem:

Do educational films and slides give the seventh grade student a clear perception of objects beyond his immediate ex-

perience?

Method:

Experimental

Procedure:

Conducted over a period of thirteen weeks. Classes equated upon the basis of the students' intelligence quotients determined by Otis Tests of Mental Ability. There was a close correlation of intelligence quotients between the two groups, the median for both being 102.5.

X-Group, the experimental group, consisted of twenty-one subjects, while C-Group, the control group, was composed of twenty pupils. Each group was given the same pre-test of the work. Work assigned to each group was the same, except that the X-Group was allowed to see motion pictures (16 mm.), and lantern slides related to their general science course. The author discussed the films and slides as they were shown to the group, so as not to leave any misunderstandings in the minds of the pupils.

Each group was given laboratory work, when needed to explain a science concept. In order that both groups might cover the same material, a study sheet guide was prepared.

After the work of the unit was completed, the same pre-test was given as a post-test. The same length of time was allotted for the unit in both groups, with the exception of the class study periods of X-Group. These were proportionally reduced to allow for showing the motion picture films and lantern

slides, Lantern slides were shown to review the topics that were discussed in the unit.

Findings:

The Experimental Group for both Units "A" and "B" showed definite improvement over the Control Group.

Conclusion:

Shows convincingly that educational films and slides are effective means of giving the basic experiences. When they are deliberately planned and consciously used to serve this purpose they should make the student better acquainted with the world in which he lives, and stimulate him to better thinking.

CRITICAL ANALYSIS

The problem is important because educational films and slides, as shown in this study, are effective means of giving basic experiences to seventh grade pupils. In the process of being solved, the problem was separated from other factors. The experimental factors: the 16 mm. film, and the lantern slides were accurately defined.

The equating of the groups was determined on the basis of intelligence quotient rankings by the Otis Tests of Mental Ability. The correlation between the groups was close, the median for both being 102.5. No other factors such as; mental age, socio-economic background, and past knowledge of the subject was considered in the equating. There is a possibility that one or all of these factors might have affected

the group equating.

Adequate control of all operating variables other than the experimental factors was carried on throughout the study. However, the small number of subjects in the study allows for only generalized statements. No mention was made whether the same teacher conducted the study for both groups.

A testing program was carried out with the pre-test becoming the post-test. The author did not attempt to validate his testing program.

Conclusions resulting from this experiment were reported under two generalizations, namely: an effective means of giving the basic experiences, and stimulating students to better thinking.

There is need for further research on this problem, in that the study could be carried on in greater detail. A study could be made using a larger number of pupils, and to determine the optimum class size. Studies should also be made using this method in other areas of the curriculum.

MEADOR, MILDRED, "ARE PICTURES AN EFFECTIVE AID IN THE TEACHING OF GEOGRAPHY?" EDUCATIONAL METHOD, (NOVEMBER, 1931), PP. 97-103.

Problem:

The value of the use of the still picture and the best method of such in the teaching of foreign geography in the elementary grades.

Method:

Experimental

Procedure:

Pupils from grades four, five, six, and seven were used for this study. The classes were from three different schools. Each class averaged thirty-five pupils, making a total of one hundred forty cases for each school. A grand total of four hundred twenty cases were used in the study. Since each of ten tests were given three times, the entire number of tabulations was twelve thousand six hundred.

Ten countries were chosen as basis for the investigation--Africa, Alaska, Australia, China, Holland, Ireland, Italy, Japan, South America, and Switzerland. The countries were chosen with no attempt to correlate the study with the geography work of the grades, but rather to avoid it, in order that results might be based solely on the value of the films.

Materials used in experiment consisted of ten films, one for each of the ten countries used in the investigation; the informational material found in the leaflets, and the ten true or false tests, one for each country studied.

Findings:

a. School "A" gained less from the lesson than either of the other schools, where pictures were used.

b. School "B" gained more after the lesson than School "A", where no motion pictures were used, but less than School "C" where motion pictures formed the basis of the lesson.

c. School "C" showed a greater gain than School "A", where pictures were not used, and School "B", where the lesson was supplemented by the use of pictures.

Conclusion:

The visual impression contributing to and forming the basis for the verbal is the most effective way of teaching geography.

CRITICAL ANALYSIS

The problem is important, as visual impression is an effective method of teaching geography. The problem was well separated from other factors in the process of being solved. The experimental factor, the motion picture film, was adequately defined.

The subjects used were from grades four through six, and totaled four hundred and twenty. No attempt was made to equate the groups. Pupils were not accurately paired according to native intelligence, previous knowledge of the subject, or socio-economic backgrounds. Equating of the groups would have made the conclusion more valuable.

A control of other factors was attempted by having no correlation between the study and geography work of the grades, in order that the results might be based solely on the value of the films. The author failed to validate the teaching procedure, as no mention was made of teaching personnel in the study.

A comprehensive testing program was carried out.

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Ten objective tests, one for each country studied, were given three times. The total number of tabulations was twelve thousand six hundred.

The conclusion, resulting from this study, was reported under the effectiveness of a teaching method in geography, is an adequate report of this problem.

There is need for further research on this problem, in that the study could be carried on in greater detail. Also, a study should be carried on in greater detail, in regard to the achievement of bright and dull children under each method. The type of teacher using each method, and the class size should also be studied.

RAMSEY, GRACE F., EDUCATIONAL WORK IN MUSEUMS OF THE UNITED STATES, H. W. WILSON, CO., NEW YORK, 1942, 289PP.

Problem:

What preparation should children make in planning museum visits?

Findings:

The experiment dealt with preparation of children for museum visits. The most successful plan for the brightest group was one in which the museum instructor went to the schoolroom to present the background one week preceding the class visit to the museum.

The most effective plan for the medium group was stimulation of children by pertinent questions. The investigator reported that in all the various teaching plans, too much

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material had been presented at a single lesson. The author indicated, if accuracy in observation is an important aim, it is better to attempt less and secure greater clarity.

Conclusions:

There is need for less instruction by the teacher, and more investigation on the part of the children. Studies of the relative effectiveness of a lecture during the museum visit led to the conclusion that discussion methods were superior to lecture methods for children of grades seven and eight.

Fifth grade children learned more when the museum instructor lectured to them in the museum halls, than they did by use of the discussion method.

THOMAS, KATHERINE G., "THE ABILITY OF CHILDREN TO INTERPRET GRAPHS," ENCYCLOPEDIA OF EDUCATIONAL RESEARCH, P. 1332.

Problem:

What are the abilities of fourth, fifth, sixth, and seventh grade pupils in the readings of the various graphs?

Procedure:

A study was made of the ability of fourth, fifth, sixth, and seventh grade pupils in the reading of circle, two-dimension, diagram, horizontal, bar, multiple-picture, and line graphs.

Conclusions:

Slow fourth grade children derive little meaning from graphs, but superior fourth grade children understand the meaning of the simple graphs, and can read simple facts from

them.

Picture graphs, two-dimension, diagrams, and circle graphs are the easiest for pupils of all grades to read, while line graphs are the hardest.

The bar-graph is the form most favorable to the recall of relative amounts, when the comparison called for involves a fair degree of difficulty.

WASHBURNE, JOHN NOBLE, "AN EXPERIMENTAL STUDY OF VARIOUS GRAPHIC, TABULAR AND TEXTUAL METHODS OF PRESENTING QUANTITATIVE MATERIALS," THE JOURNAL OF EDUCATIONAL PSYCHOLOGY, (SEPTEMBER, 1927), PP. 361-74.

Problem:

What are the results of objective measurement upon seventh and eighth grade children of various arrangements of quantitative material?

Method:

Experimental

Procedure:

A short account of the economic history of Florence, Italy was written. Then a unit was selected in order that the content might be equally unfamiliar to all the children.

The narrative included one paragraph, which contained specific quantitative facts. In each of the forms, this paragraph was varied. The rest of the paragraph was constant, and the paragraph in question varied only in the form of presentation and not in the data themselves. In some of the forms the

quantitative paragraph appeared as a statistical table, in others as a bar-graph, in others as a pictograph or linegraph, and in still others the data were presented in narrative form.

Between two hundred and three hundred pupils were tested on each form. The tests, which were identical for all forms, consisted of two parts--the first pertaining to the story in general, and the second to the quantitative paragraph. All the tests were given with a uniform procedure by two individuals.

Findings:

a. For complex or slightly complex static comparisons use a bar-graph.

b. For extremely simple static comparisons use a pictograph.

c. For dynamic comparisons use a linegraph.

d. Use questions after a graph to emphasize its chief features.

e. For specific amounts use a statistical table.

Conclusion:

The graphic, tabular, or textual form, in which complex numerical data are presented, make a decided difference in the resultant learning.

CRITICAL ANALYSIS

The problem is important, as the procedure in which complex numerical data are presented makes a decided difference in the resultant learning. The problem was well separated from other factors in the process of being solved. The problem was accurately defined, as were the experimental factors: the bar

graph, the pictograph, the line graph, and the statistical table.

The procedure used was good as the author went to great pains to validate his experimental factors. The unit was selected in order that the content might be equally unfamiliar to all the children. The narrative included one paragraph which contained specific quantitative facts. The rest of the material was constant, with the paragraph varying only in form of presentation and not in data.

No equating of groups was carried out. Since between two and three hundred subjects were tested in each form, the ability and background range would be high. Some provision should have been made to pair subjects according to native intelligence. The pairing of groups of presumably equal intelligence could not have been very accurate.

The testing program was somewhat validated, as all were given with a uniform procedure by two teachers, and all were identical. The large population of subjects would tend to make them more reliable.

The conclusion resulting from this study was reported under presentation of complex numerical data. This is a good report of the problem.

There is need for further research on this problem, in that a study should be made in regard to the achievement of bright and dull children under each method of presentation. A study should also be made to determine at which grade level

complex numerical data should be presented for the first time, and also to determine the efficiency of each presentation on pupils in lower grades.

WILLIAMS, FLORENCE, "AN INVESTIGATION OF CHILDREN'S PREFERENCE FOR PICTURES," ELEMENTARY SCHOOL JOURNAL, (OCTOBER, 1924), PP. 119-26.

Problem:

By what process do children learn to know and appreciate good pictures?

Method:

Nominative-survey

Procedure:

Study was made in the Public Art Gallery in Richmond, Indiana. A collection of portraits on exhibit included thirty-two oil paintings, twenty-eight colored prints, and a number of miniatures, tintypes, and daguerreotypes. Classes of fifth, sixth, seventh, and eighth grade children totaling nine hundred thirty nine were brought to the art gallery to see the exhibit.

As soon as each group arrived, the children were asked to look at all the portraits carefully and pick out the one, which they liked best. This was done without communication on the part of the children to prevent any strong-minded member of the class from influencing the vote. Each child wrote the catalogue number of the picture he liked best on a slip of paper, and handed it to the teacher. The groups of pictures were all given one catalogue number.

The distribution of the votes showed that 82.6% of the total vote was given to a group of eleven pictures. The remaining 17.4% was divided among twenty eight pictures, which received less than fifteen votes each, leaving twenty four pictures which received no votes.

Findings:

a. there is a marked tendency for the majority of children to like the same pictures.

b. most children show a tendency to choose pictures which are examples of good painting.

c. children like pictures in which there are a few large, easily recognized objects in the foreground.

d. children like pictures of people, places, or incidents with which they are familiar.

e. a study of the techniques and composition, or facts about the artist apparently contributes very little to a child's choice.

f. instruction influences only to a small extent a child's liking for pictures.

Conclusion:

A study of the technique and composition, or facts about the author apparently contributes very little to the enjoyment of the picture.

CRITICAL ANALYSIS

The problem is worthy as the knowledge and apprecia-

tion of good pictures should begin in the elementary school. The purpose of the problem is definitely stated--by what process do children know and appreciate good pictures? The reliability of data was obtained objectively by independent voting of the subjects. However, the data given are insufficient for the drawing of reliable conclusions.

No valid standards of comparison were used, as there was no data presented from studies of a similiar nature. The field of study was accurately defined by listing the various art media exhibited. The procedure was logical and pertinent, as it related well to the problem.

The interpretation was adequate as it concerned a local situation, general practice, and the purpose of the study was important. Good generalizations appear. The report was complete and logical as it gives the detailed research experience necessary to carry out the procedure of the study.

Further research is provided for, as no unsolved problems are listed. Studies should be made to determine the differences that may be found among children of varied mental abilities, experiences, and possibly sex. There is need for further investigation to determine the types of pictures which children like best.

WITTICH, PAUL AND FOWLKLES, GUY, "AUDIO-VISUAL PATHS TO LEARNING," UNIVERSITY OF WISCONSIN, (JUNE, 1943).

Problem:

What adjustments and problems does the use of films

now present for the teacher and supervisor?

Method:

Experimental

Procedure:

The controlled experiment was conducted at the Marquette Elementary School, Madison, Wisconsin. There were two hundred sixty-four children of the third, fourth, and fifth grades used as subjects. Twenty-seven Encyclopedia Britannica Films were used in three differing presentation methods.

The first method involved no special advance preparation other than in the course of casual and unorganized class work. After the film, the class answered test questions. The second method included advance reading of a general description of the film and its mood, study of difficult words and phrases inthe sound track of the film. Follow-up after showing the film consisted only of taking a test immediately after seeing it.

In addition to the steps taken in the second method, the third procedure had the class do three things twenty-four hours later: (a) answer a set of discussion questions, (b) see the film again, and (c) take the test a second time immediately.

Findings:

The third method yielded substantially superior results. Not only does the use of the third method achieve scores virtually double those of the first, as regards informa-

tion gained, but the second and third methods were found to make students increasingly able observers and better able to handle thought questions.

It was further found that children of low and high intelligence quotient appear to be motivated and to learn equally well from films, although previous beliefs in the field have held that superior results are obtained with subjects having low intelligence quotients.

Conclusion:

The evidence of this study emphasizes the value of thorough advance preparation of the class and follow-up, including discussion and a re-showing of the film, in drawing maximum benefits from sound motion pictures in teaching.

CRITICAL ANALYSIS

The problem is important as it tends to dispel the illusions of complication created by some advocates of audio-visual materials, and the carelessness of those of the opposite extreme. In the process of being solved, the problem was isolated from other factors. The experimental factor, the sound film, was accurately defined.

No group equating was used. The subjects were two hundred and sixty-four children from grades three through five, with varied mental abilities and experiences.

The control of factors other than the control factors was fair. Reading disabilities and health of the subjects could have prevented them from giving a representative sample

of their true ability.

A comprehensive testing program composed of three tests, increasing in difficulty, was carried out. Each of the tests was based on each of the three methods being studied. The authors did not validate their testing program, nor was the reliability of the tests determined.

Conclusions resulting from this experiment were reported under three generalizations, namely: information gained, increasing observation, and achievement of both bright and dull children. This amounts to an excellent report of the problem.

There is need for further research on the problem, in that the study could compare achievements of different ability groups. Also a study should be made with children in higher grades of the elementary school to discover if the above conclusions are consistent.

CHAPTER THREE

GENERAL SUMMARY

Woefel and Wiles (34) found that teachers spent some time before the broadcast in checking mechanical arrangements; that teachers encouraged note taking; and that after the broadcast students reviewed the content of the lesson. Cook (5) found that the materials taught by the radio method were retained at least as well as those taught in a regular classroom situation.

Lumley (20) classified radio broadcasts into six categories: a) radio lessons with a radio teacher taking the place of the regular classroom teacher, b) radio talks, c) recitations or readings, d) interviews, debates, and conversations, e) dramatizations, and f) musical programs with comments and explanations. Although there has been no conclusive evidence concerning the relative effectiveness of these techniques, children seem to prefer dramatized stories to all other types of educational broadcasts. Cantrell and Allport (2) reported that radio talks should be from ten to twenty minutes in length; that specific illustrations aid in the understanding of an idea; that the use of short sentences helps in the presentation of factual material; and that most of the pupils prefer male announcers to female announcers.

Hoekenca (15) in a study on radio in the music program of rural schools reported: a) interest in radio as a medium of instruction is increasing; b) effect of broadcast

greatly decreased because of insufficient preparation on part of both class and teacher; c) radio music broadcasts which are planned for rural children, should take into consideration the backgrounds and interests of these children. To determine the most effective methods of teaching by radio, Lohmeyer and Ojemann (19) used three types of presentation (drama, talk, and discussion) with three types of broadcast material (history, science, and literature) and reported that in the acquisition of information the drama and the talk were superior to the discussion, but that in the influence upon attitudes there was no difference between the three methods of presentation. Loder (18) in an experimental study comparing Radio and Non-radio learning reported results favoring the presentation of material directly rather than through a loud speaker.

CANTRELL, J. AND ALLPORT, S. RADIO IN THE CLASSROOM, HARPER AND BROTHERS, NEW YORK, 1938, PP. 276.

Conclusions:

The authors found in experiments that: a) radio talks should be from ten to twenty minutes in length, b) the presentation of a general idea followed by specific references or concrete illustrations is more interesting and better recalled to the pupils, than an entirely specific and an entirely general passage, c) if the material presented has no intrinsic interest and is of a highly factual nature, the use of short sentences increases its memory span, and d) the majority of pupils prefer male announcers to female announcers.

Cantrell and Allport also reported that radio talks are more comprehensible and interesting if they are delivered at relatively low rates of speed. They recommended the following rates of speed for radio talks:

a. theoretical material from 110 to 130 words per minute
b. factual exposition from 120 to 140 words per minute
c. directions from 90 to 115 words per minute
d. news from 120 to 140 words per minute
e. narrative from 120 to 150 words per minute

The authors also concluded that the use of short sentences helps in the presentation of factual material.

COOK, DEAN C. AND NEMZCK, CLAUDE L., "THE EFFECTIVENESS OF TEACHING BY RADIO," JOURNAL OF EDUCATIONAL RESEARCH, (OCTOBER, 1939), PP. 105-9.

Problem:

To measure the educational value of educational radio programs for intermediate school pupils.

Method:

Experimental

Procedure:

Two groups of one hundred-fifty pupils each, selected by matched pairs technique so that the groups were equivalent in measured intelligence, sex, and grade. Group "A", called Radio Group, listened to fifteen educational programs. Group "B", the Non-radio group, was taught the same lessons but was not permitted to listen to the broadcasts.

An outline and synopsis, and in many cases a series of questions were reviewed by the experimenter before the programs were broadcast. From these a test was prepared for each lesson. The test was given before the program was broadcast or the lesson taught, and again after the broadcast or after the lesson was taught.

The two groups were tested before and after each lesson. The tests were scored on a percentage basis. The change from the initial test to the final test was calculated for each pupil. The single tests were short, lowering the reliability of the individual tests. However, the reliability

of the fifteen tests combined should be fairly high because they yield a total of two hundred seventeen items. The Radio group was superior in total tests to the Non-radio group.

Findings:

Instruction by radio has a definite place in pupil growth and development. The radio certainly should be one instructional device.

Conclusions:

This study demonstrates that lessons taught by means of radio effectively aid pupils in their classwork.

The materials taught by the radio method were retained at least as well as those taught in a regular classroom situation.

CRITICAL ANALYSIS

The problem is important as radio is being used as a learning aid, and its educational value should be measured. The problem was well separated from other factors in the process of being solved. The problem was accurately defined as was the experimental factor, the radio broadcast.

The procedure used was good as two balanced groups of one hundred and fifty pupils each were used in the study. The equating of the groups was determined by the matched pairs technique, so that each group was equivalent in measured intelligence, sex, and grade. No mention was made whether any pupils dropped out of the experiment, or what provision was made if they had.

The control of other factors was good as the Radio group listened to educational programs, while the Non-radio group was taught the same lessons but was not permitted to listen to the broadcasts. The authors did not state who taught the groups, so it is not known if the teaching procedure is valid.

The testing program was valid as tests were prepared from the questions reviewed by the experimenter before the programs were broadcast. The two groups, Radio and Non-radio, were tested before and after each lesson. The change from the initial test to the final test was calculated for each subject. The reliability of the testing program is high because of the large number of subjects, and the number of tests that were administered.

Conclusions resulting from this study were reported under two generalizations, namely: retention of learning, and changes in pupils' growth and development. This is a good report of the study.

There is need for further research on this problem, in that a study should be made to determine the optimum class size. Also the problem could be carried on in greater detail.

HOEKENCA, GERTRUDE A., "RADIO IN THE MUSIC EDUCATION PROGRAM OF RURAL SCHOOLS," CALIFORNIA JOURNAL OF ELEMENTARY EDUCATION, (MAY, 1941), PP. 241-48.

Problem:

The use of radio in music education in supervised

rural schools.

Method:

Descriptive

Procedure:

Children ranged from the fifth through the eighth grades, and with an age distribution of from nine to seventeen years of age.

Replies to questionnaires were received from forty-six counties out of a total of fifty-eight. Of these, San Francisco County had no rural schools. One reported that a survey of the music situation was being contemplated, but no information was available at the time. The remaining forty-four counties represented one thousand nine hundred fifty-seven rural schools. Some of the counties gave such vague information on the number of schools having radios, that their replies to this question were discounted in arriving at an average figure. Of the one thousand six hundred and two rural schools giving definite replies as to the possession of, or access to, a radio, six hundred and six, or thirty-eight per cent, replied in the affirmative. Five counties reported difficulty in reception due to geographical location.

It was noted that, in general, those counties having music supervisors showed more radio activity than those without such supervision. In others showing decided activity, there was a department of radio education or of research and reference. Fifteen counties reported no recommendations given

as to either desirable in-school or out-of-school listening programs, while the remainder recommended one or both types of programs either by means of bulletins or teachers' meetings.

Findings:

The narrower the area of instruction for which the broadcast is intended, the more closely it tends to correlate with the work of the basic course.

The broader the area which the broadcast is intended to cover, the more the broadcast becomes merely supplementary in nature.

Conclusions:

a. interest in radio as a medium of instruction is increasing.

b. in many cases the effectiveness of the broadcast was greatly decreased because of insufficient preparation on the part of both the class and teacher.

c. there is need for radio music broadcasts which tie in more closely with classroom work following a prescribed course which are scheduled to fit the rural program, which are planned for the capabilities and interests of rural children, and which take into consideration their backgrounds.

CRITICAL ANALYSIS

The problem is worthy as radio is playing a larger role in education. The purpose of the problem is definitely stated--the use of radio in music education in supervised rural schools.

Reliable data in the form of objective facts and not

opinion were used. The material selected was relevant, as it was important to the music education program of rural schools.

Valid standards of comparison were used as the chronological age range of pupils was from nine to seventeen years. The standards of comparisons used were not similiar in the forty-six counties who received the questionnaires, as some of the counties had music supervisors. Those counties having supervision showed more radio activity than those without such supervision. An accurate description of the place of the investigation was given. The procedure used was logical and related to the problem.

The interpretation was pertinent and adequate, as it concerned local needs, general practice, and the purpose of the check was important. The report was not complete. Forty-six counties out of a total of fifty-eight replied. A number of replies were discounted because of vagueness. The report was in good form and was logical.

There is need for further research as to selection of desirable in-school and out-of-school listening programs either by means of bulletins or teachers' meetings.

LODER, J. EDWARD, "A STUDY OF AURAL LEARNING WITH AND WITHOUT THE SPEAKER PRESENT," JOURNAL OF EXPERIMENTAL EDUCATION, (SEPTEMBER, 1937), PP. 46-60.

Problem:

Does it make a difference in the amount learned and

retained whether or not the speaker is in the learners' presence?

Method:

Experimental

Procedure:

Four hundred forty-nine pupils of the eighth grade were the subjects. Of these four hundred forty-nine subjects, two hundred and seven were in group 1, and the two hundred forty-two remaining were in group 2. The group rotation technique was selected so that all the subjects heard half the material by each method, alternation taking place throughout. Four lessons were taught by the two types of presentation, and a comparison made of the learning.

As the lecture method is very common in the classroom and more familiar than the radio, it was chosen for the type of presentation for the study.

After a pre-test was given, four lessons were presented to the subjects, upon which they were tested immediately after each lesson, and again at two later dates. In presenting each lesson in each experimental set-up, there were two groups of subjects. One group heard the lesson directly from the speaker with the speaker in their presence, while the other group heard the presentation simultaneously in another room over a loud speaker.

Findings:

Pupils made the greatest net learning gain on the

material presented to them directly. While there was less forgetting of the amounts learned by both types of presentation, a higher percentage of the material learned over the loud speaker was remembered.

Conclusion:

The results from this study favor the presentation of material directly rather than through a loud speaker.

CRITICAL ANALYSIS

The problem is important because there is a definite trend in education today to utilize the audio materials. The problem was well separated from other factors in the process of being solved. The experimental factor, the loud speaker method, was well defined.

The method of procedure was good, in that the group rotation technique was used with alternation taking place throughout the experiment. Whatever differences there may have been in general ability would be eliminated as a factor influencing the results of the experiment, because each procedure would be affected in like degree by the superiority or the inferiority of a group.

The control of all operating variables other than the experimental factor was not mentioned. There is a definite possibility that poor acoustics, unfamiliarity with the procedures, or a physical defect, or illness, could operate to the detriment of the study.

The testing program was validated by being administered to both of the groups immediately after the presentation of each lesson, and again at two later dates. There were four lessons taught by the two types of presentation, and a comparison was made of the learning . Whatever difficulty that might have been encountered in the testing procedure was rotated out as a factor affecting the results of the study.

The conclusions that resulted from this study were reported under three generalizations, namely: presentation of material, the net learning gain, and retention. This is a good report of the problem.

There is need for further research on the problem, in that the study could be carried on in greater detail. A study should be made in regard to net learning and retention, substituting educational radio programs, records, and recordings for the loud speaker. A study should be made to determine the type of teacher who should use each method, the ideal class size for each method, and the achievement of bright and dull children using each method. Results in various areas of the curriculum could also be studied.

LOHMEYER, DONNASUE AND OJEMANN, RALPH H., "THE EFFECTIVENESS OF SELECTED METHODS OF RADIO EDUCATION AT THE SCHOOL LEVEL," JOURNAL OF EXPERIMENTAL EDUCATION, (DECEMBER, 1940), PP. 115-20.

Problem:

What are the most effective methods of teaching by

radio?

Method:

Experimental

Procedure:

Subjects were taken from the sixth grade classes of four schools. The groups were equated on general ability, amount of time spent listening to the radio, and the initial content score as measured by preliminary testing.

Tests were presented to each group a week prior to the presentation of the programs. A week later, the program was presented to each group in a rotating order. In each case the program was presented, a test covering the material given in that program followed immediately. A pause for relaxation was allowed, and then the second program and the second test was given. After another period was allowed for relaxation, the third program was introduced and the third test was given. This completed the testing program.

Three content areas, one each in history, science, and literature were treated in three different forms. The selections chosen were: a) an account of Lord Clive's Adventure in India, b) an account of the Discovery of the cause of African Sleeping Sickness, and c) an adaptation of a portion of Hugo's Les Miserables. The three different types of presentations to which each of these stories were adapted were: a) straight talk, b) informal discussion using several voices, and c) dramatization.

Conclusions:

For presentation of simple ideas to the entire group of subjects, the talk and the drama methods were significantly more effective than the discussion method.

When the entire group was divided on the basis of amount of radio listening as well as general ability, the talk and the drama methods were significantly more effective for those who are infrequent radio listeners, while there was no significant differences in effectiveness for those who listen to the radio frequently.

For the teaching of attitudes, taking the group as a whole, no one method was consistently more effective than any other. Of the three attitudes presented, the scientific attitude seemed to be the most difficult for the listener to grasp.

CRITICAL ANALYSIS

The problem is important as the most effective methods of teaching by radio is important to educators using this medium of instruction. The problem was well separated from other factors in the process of being solved. The problem itself was accurately defined, as was the experimental factor, the radio.

Group equating was determined on general ability, radio listening time, and scores of initial preliminary test.

The procedure used was good in that the group rotation technique was used. Whatever differences existed in

general ability would be eliminated as a factor influencing the results of the study because each presentation would be affected in like degree by the superiority or inferiority of a group.

The problem was fairly well controlled in both of the groups. The authors failed to validate the teaching procedure used. The testing program was validated by testing each group a week before the presentation of the programs, and again immediately at the conclusion of each program. Whatever difficulty might have existed in testing was rotated out as a factor affecting the results of the study.

Conclusions resulting from this study were reported under three generalizations, namely: presentation of simple ideas, differences between radio and non-radio listeners, and the teaching of attitudes. This is a good report of the study. It is possible the scientific attitude was the most difficult for the pupils to grasp, because the scientific program is used less frequently in presenting childrens' programs.

There is need for further research in the problem in that the conclusions apply only to programs used in this study. More experimental work must be done with all three methods to determine the effectiveness of each. Similiar studies should be conducted away from the classroom, as there is a possibility that the classroom is too familiar or distasteful to be effective.

LUMLEY, FREDERICK H., "MEASUREMENT IN RADIO," OHIO STATE UNIVERSITY, COLUMBUS, 1934, 318 PP.

Conclusions:

Techniques used in educational broadcasts have been classified by the author into six categories:

a. straight radio lessons where the broadcasting teacher is substituted for the regular classroom teacher.
b. radio talks.
c. recitations.
d. dialogues, interviews, debates, and conversations used to present contrasting points of view.
e. dramatizations.
f. musical programs with comments and explanations.

Although there has been no conclusive evidence concerning the relative effectiveness of these techniques, school children seem to prefer dramatized stories to all other types of educational broadcasts.

WOELFEL, NORMAN AND WILES, KIMBALL, "HOW TEACHERS USE SCHOOL BROADCASTS," THE EDUCATION DIGEST, (APRIL, 1942), PP. 14-16.

Problem:

The use that teachers make of educational radio programs in the classroom.

METHOD:

Nominative

Procedure:

The study was one of the first problems investigated

by the Evaluation of School Broadcasts research staff. The cooperating teachers, were chosen on the basis of their teaching ability and their interest in radio. Teachers were asked to make detailed reports of the utilization practices they considered most successful with their classes. On the basis of these reports from skilled teachers a checklist of one hundred and one utilization practices they considered more successful with their classes was made.

They included activities preparatory to the broadcasts, follow-up activities, and a fourth group of items that were classified as "Conditions While Listening"--the type of room, type of radio, interruptions to listening, and etc.

During the school year 1938-39, twenty teachers made two hundred and twenty five reports on broadcast utilizations using this checklist.

Conclusions:

A. The most frequent preparatory activities:

   a. posting an advance announcement of the broadcast.
   b. making necessary seating arrangements and room adjusments.
   c. testing the radio receiving apparatus.

B. Most frequent activities to make the program more meaningful.

   a. consulting the manual that accompanied the broadcast.
   b. attempting to carry out the suggestions in the manual.
   c. planning to correlate the probable broadcast content

with regular classroom activities.

d. supplementing the topic of the broadcast program with assigned reading.

e. encouraging pupils to take notes on the broadcast.

CRITICAL ANALYSIS

The problem is worthy as the use teachers make of broadcasts is important. The purpose of the problem is definitely stated--how teachers use school broadcasts. The reliability of the data was obtained from two hundred and twenty-five reports on broadcast utilizations, made by competent teachers using a checklist. However, as only twenty teachers reported, the data given are insufficient for the drawing of reliable conclusions.

No valid standards of comparison were used, as there was no data presented from studies of a similiar nature. The procedure was both logical and pertinent, as it related well to the problem.

The interpretation was adequate as it concerned general practice, and the purpose of the study was important. Excellent generalizations appear. The report was complete and logical, as it gives the detailed research experience that is necessary to carry out the procedure of the study.

Further research is provided for, as no unsolved problems are listed. A study should be made using more subjects to determine what type of teacher best utilizes school broadcasts.

CHAPTER FOUR

Some educators, who have become acquainted with the Audio-Visual materials, believe that the showing of sound and silent films, slides, the presentation of graphic materials, and radio broadcasts, with little or no preparation on the part of the teacher constitutes an efficient and creditable audio-visual program. Intelligent leadership in these fields is essential and will result in clarified and validated objectives.

Research in the field of audio-visual materials should affect their practice in the classroom. If educational films and slides are consciously used, research has shown that they make the student better acquainted with the world in which he lives, and stimulate him to better thinking. Teachers should integrate the audio-visual materials with the regular classwork. Unless integrated, they are of questionable teaching value, and money spent on them is largely wasted from an educational viewpoint. Instruction, of which motion pictures are a part, tends to influence conduct largely through giving clear-cut information and pointing out the application of this information to conduct. Research shows that children of low and high intelligence quotients appear to be motivated and to learn equally well from films.

Research shows that no charts, except those of a purely pictorial nature, should be introduced before grade five. Only simple graphs should be used in the fourth grade,

with only the superior children having the ability to read simple facts from them.

Teachers should spend some time before presentation of the audio-visual materials checking the mechanical arrangements. In the field of motion pictures, the film should be pre-viewed by the teacher. In school broadcasts, a review of the program, if obtainable, is desirable. During school broadcasts, teachers should encourage note-taking. At the conclusion of both the films and slides, and the broadcast, the class should review the content of the program. The effectiveness of both materials is greatly decreased because of inefficient preparation on the part of both class and teacher.

In this paper, the research has been summarized and critically analyzed for the information of the user of audio-visual materials in the classroom.

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